

CLAIMS

1. A method for setting a color tone of a monochrome image, comprising the steps of:

5 (a) displaying a color tone setting window for use in setting a color tone of a monochrome image, the color tone setting window including an ink color circle for specifying color component intensities representing three chromatic primary color inks with a single specified point therein; and

10 (b) determining the color component intensities representing the three chromatic primary color inks as parameters defining the color tone of the monochrome image in accordance with the position of a point specified in the ink color circle, wherein

15 the ink color circle is configured to enable the color component intensities representing the three chromatic primary color inks to be visually recognized from the position in the ink color circle.

2. A method according to Claim 1, wherein the three chromatic primary color inks are cyan ink, magenta ink and yellow ink, which constitute output of a one-dimensional lookup table that is used for color conversion 20 during printing of a monochrome image to obtain output of ink amounts for the plural ink colors in response to input of a lightness tone value of an image.

3. A method according to Claim 1, wherein an arbitrary point in the ink color circle is mapped to a corresponding point in an ink color triangle 25 which is a hypothetical equilateral triangle corresponding to the ink color circle, and

the ink color triangle is an equilateral triangle having a common center with the ink color circle such that the color component intensities representing the three chromatic primary color inks at the corresponding point are 30 determined in accordance with lengths of three lines drawn perpendicularly to three sides of the ink color triangle respectively from the corresponding point.

4. A method according to Claim 3, wherein the corresponding point in the ink color triangle corresponding to an arbitrary point in the ink color circle is mapped such that the corresponding point is present on a straight line connecting the center of the ink color circle and the arbitrary point.

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5. A method according to Claim 4, wherein a corresponding point in the ink color triangle corresponding to an arbitrary point on outer circumference of the ink color circle is mapped such that the corresponding point is present on a side of the ink color triangle.

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6. A method according to Claim 5, wherein the center of the ink color circle expresses an achromatic color, and

the mapping has a non-linear conversion characteristic wherein change in the color component intensities representing the three chromatic primary color inks corresponding to change in position of a point decreases as the point becomes closer to the center of the ink color circle.

15 7. A method according to any of Claims 1 through 6, wherein the color tone setting window further includes a sample image display area for displaying a monochrome sample image, and

20 the step (b) includes a step of adjusting the color tone of the monochrome sample image based on the color component intensities representing the three chromatic primary color inks that are set using the ink color circle.

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8. A method according to Claim 7, wherein the color tone setting window is able to display the ink color circle and color sliders.

30 9. A method according to Claim 8, wherein the color sliders include three ink color sliders used to set the color component intensities representing the three chromatic primary color inks.

10. A method according to Claim 8 or Claim 9, wherein the color tone setting window includes a first window that has the ink color circle and a second window that has the color sliders such that the first and second windows are switched to be selectively displayed according to user selection.

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11. A method according to Claim 10, wherein when the first window is switched to the second window according to user selection, the color tone specified via a specified point in the ink color circle is reflected and displayed on the color sliders.

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12. A method according to Claim 11, wherein when the user instructs that the second window be switched to the first window, switching to the first window is prohibited and display of the second screen is maintained, or a warning display is issued indicating that the attempted switch to the first window is invalid.

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13. A method according to any of Claims 8 through 12, wherein the color tone setting window has buttons to set multiple basic color tones, such that when a user selects one basic color tone, the specified point in the ink color circle and slider positions of the color sliders are displayed at a position indicating the selected basic tone.

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14. A method according to any of Claims 1 through 13, further comprising the steps of:

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(c) providing a reference one-dimensional lookup table that inputs an image lightness tone value and outputs ink amounts for plural types of ink including multiple chromatic inks; and

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(d) generating a printing-use one-dimensional lookup table for use in printing of a monochrome image by adjusting amounts of the multiple chromatic inks in the reference one-dimensional lookup table in accordance with the color component intensities representing the three chromatic primary color inks determined in the step (b).

15. A method according to Claim 14, wherein multiple inks having different concentrations of identical color component are usable, and ink amounts of the multiple different-concentration inks are adjusted using an
5 identical color component intensity value.

16. A method according to any of Claims 1 through 14, further comprising the steps of:

10 determining an ink amount adjustment value for each color component based on the intensity value for each color component; and

adjusting an ink amount for each color component using the ink amount adjustment value for each color component,

15 wherein relationship between the intensity value of each color component and the ink amount adjustment value for each color component is established independently for each color component.

17. A method for setting a color tone of a monochrome image, comprising the steps of:

20 (a) displaying a color tone setting window for use in setting a color tone of a monochrome image, the color tone setting window including an ink color triangle for specifying color component intensities representing three chromatic primary color inks with a single specified point therein; and

25 (b) determining the color component intensities representing the three chromatic primary color inks as parameters defining the color tone of the monochrome image in accordance with the position of a point specified in the ink color triangle, wherein

the ink color triangle is configured to enable the color component intensities representing the three chromatic primary color inks to be visually recognized from the position in the ink color triangle.

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18. An apparatus for setting a color tone of a monochrome image, comprising:

a user interface module configured to display a color tone setting window for use in setting a color tone of a monochrome image, the color tone setting window including an ink color circle or an ink color triangle for specifying color component intensities representing three chromatic primary color inks with a single specified point; and

5 a color tone determining module configured to determine the color component intensities representing the three chromatic primary color inks as parameters defining the color tone of the monochrome image in accordance with the position of a point specified in the ink color circle or the ink color triangle, wherein

10 the ink color circle or the ink color triangle is configured to enable the color component intensities representing the three chromatic primary color inks to be visually recognized from the position in the ink color circle or the ink color triangle.

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19. A computer program for use in setting a color tone of a monochrome image to be printed, the program causing a computer to realize the functions of:

20 displaying a color tone setting window for use in setting a color tone of a monochrome image, the color tone setting window including an ink color circle or an ink color triangle for specifying color component intensities representing three chromatic primary color inks with a single specified point; and

25 determining the color component intensities representing the three chromatic primary color inks as parameters defining the color tone of the monochrome image in accordance with the position of a point specified in the ink color circle or the ink color triangle, wherein

30 the ink color circle or the ink color triangle is configured to enable the color component intensities representing the three chromatic primary color inks to be visually recognized from the position in the ink color circle or the ink color triangle.